

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
15 July 2004 (15.07.2004)

PCT

(10) International Publication Number
WO 2004/059287 A3

(51) International Patent Classification⁷: **G05B 13/02**,
G05D 23/00, C12Q 1/00, 1/24, 1/06, C12M 1/34, 3/00

(21) International Application Number:
PCT/US2003/040880

(22) International Filing Date:
22 December 2003 (22.12.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/435,601 20 December 2002 (20.12.2002) US

(71) Applicant (for all designated States except US): **DAKO-
CYTOMATION DENMARK A/S** [DK/DK]; Produk-
tionsvej 42, DK-2600 Glostrup (DK).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **BUCHANAN,**
Kristopher [US/US]; 4300 Shadowbrook Court, Fort
Collins, CO 80526 (US). **KEY, Marc** [US/US]; 290 Sad-
dle Lane, Ojai, CA 93023 (US). **FAVUZZI, John** [US/US];
5086 San Bernardo Place, Santa Barbara, CA 93111 (US).
WELCHER, Rosanne [US/US]; 1175 Church Street,

Ventura, CA 93001 (US). **GUGGENHEIMER, Benno**
[US/US]; 608 Park Street, Fort Collins, CO 80521 (US).
CLARK, Robert [US/US]; 3747 Jefferson Drive, Love-
land, CO 80538 (US). **BARBER, Michael** [US/US]; 1924
Ames Court, Fort Collins, CO 80526 (US). **LATHROP,**
Bob [US/US]; 1667 Glenrock Court, San Jose, CA 95124
(US).

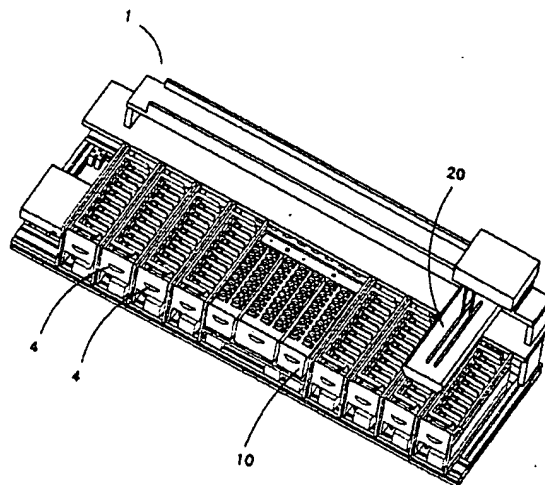
(74) Agent: **SANTANGELO, Luke**; Santangelo Law Offices,
P.C., 125 South Howes, Third Floor, Fort Collins, CO
80521 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT (util-
ity model), AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ,
CA, CH, CN, CO, CR, CU, CZ (utility model), CZ, DE
(utility model), DE, DK (utility model), DK, DM, DZ, EC,
EE (utility model), EE, EG, ES, FI (utility model), FI, GB,
GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG,
KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG,
MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL,
PT (utility model), PT, RO, RU, SC, SD, SE, SG, SK (util-
ity model), SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG,
US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (BW, GH,
GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),

[Continued on next page]

(54) Title: SYSTEMS AND METHODS OF SAMPLE PROCESSING AND TEMPERATURE CONTROL



(57) Abstract: Systems and methods of sample processing and temperature control are disclosed. Specifically, the present inven-
tion provides temperature control in relation to sample processing systems and methods of processing samples. Some embodiments
provides temperature control for sample carriers and processing materials, such as reagents. Corresponding systems and devices
are disclosed, including sample processing systems (1) (Fig. 10), sample carrier temperature regulation systems, reagent tempera-
ture regulation systems, sample processing control systems, and temperature regulation devices. The present invention in particular
applicability to the fields of immunohistochemistry, in-situ hybridization, fluorescent in-situ hybridization, special staining, such
as special staining of histological samples, microarray sample processing, and cytology, as well as other chemical and biological
applications.

WO 2004/059287 A3



Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE,
SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA,
GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(88) Date of publication of the international search report:
27 January 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/40880

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G05B 13/02; G05D 23/00; C12Q 1/00, 1/24, 1/06 ; C12M 1/34, 3/00
US CL : 700/28, 299, 300; 435/4, 30, 39, 287.1, 287.3, 288.4

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 700/28, 299, 300; 435/4, 30, 39, 287.1, 287.3, 288.4

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Medline, CAPus, Biosis, Scisearch

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,296,809 B1 (RICHARDS et al.) 02 October 2001 (02.10.2001), whole document, especially columns 1-14.	1-4, 6-18, 20-34, 37-56, 59-84
X	US 6,352,861 B1 (COPELAND et al.) 05 March 2002 (05.03.2002), column 1, lines 15-24;	1, 6-9, 12-14, 16-18, 24, 31-32, 37-46, 59-61, 63-64, 67-68, 73-75, 79, 82-84
—	column 1, line 42- column 4, line 57.	1-4, 6-18, 20-34, 37-49, 51-56, 59-84
Y		
X	US 6,183,693 B1 (BOGEN et al.) 06 February 2001 (06.02.2001), column 1, line 60-	1, 6-9, 12-14, 16-18, 21, 24, 31-32, 37-46, 59-61, 63-64, 67-68, 73-75, 79, 82-84
—	column 2, line 5; column 2, lines 14-16; column 12, lines 30-34.	1-4, 6-18, 20-34, 37-49, 51-56, 59-84
Y		

☒ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"B" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

*T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

*X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

*Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

*&" document member of the same patent family

Date of the actual completion of the international search

26 October 2004 (26.10.2004)

Date of mailing of the international search report

09 DEC 2004

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Facsimile No. (703) 305-3230

Authorized officer

Michael Wityshyn

Telephone No. 571-272-0926

INTERNATIONAL SEARCH REPORT

PCT/US03/40880

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 3,600,900 A (BUDDECKE) 24 August 1971 (19.08.1971), column 1, line 67- column 2, line 32; column 5, lines 15-50.	1-4, 6-18, 20-34, 37-84
A,P	12 Most Frequently Asked Questions About Thermoelectric Cooling. In: TELLUREX CORPORATION. http://www.tellurex.com/12most.html . accessed 27 October 2004.	20-22, 48-58, 69-72

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/40880

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claim Nos.: 5
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
Please See Continuation Sheet
3. ☒ Claim Nos.: 19,35,36 and 85-95
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐
☐

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

PCT/US03/40880

Continuation of Box I Reason 2:

Applicant's claim 5 is unclear to the point that no reasonable meaning can be derived from the language. Reference is made to the method of claim 1; however, reference to a particular step is omitted. Instead, claim 5 is directed to the step of corresponding to at least one temperature tolerance. It is not clear what the step of corresponding was meant to refer to, but additionally, it is not clear what was intended by "at least one temperature tolerance." It is not clear what is tolerating the temperature. Therefore, no discernible meaning can be withdrawn.